Course Description

Course No. CEVE 450 **Course Title:** Remote Sensing
Instructor's or Course Coordinator's Name: Dale S. Sawyer
ABET Program Requirement or Elective? Elective

Course description: This course introduces students to electromagnetic remote sensing methods and applications. We consider remote sensing platforms ranging from aircraft to orbiting satellites to spacecraft fly-by's. We consider the breadth of the electromagnetic spectrum from visible light to radar and radio signals, and in some cases lasers. Students will learn how materials interact with electromagnetic energy to reveal information about the material's atomic structure, molecular structure and/or roughness and shape. We look at passive and active remote sensing methods. Students will learn how to obtain remote sensing data, how to display those data effectively, how to extract information from the images, and how to reach defensible conclusions about targets/surfaces of interest.

This is a computationally intensive course. Students are required to complete bi-weekly remote sensing computer assignments as well as background reading and discussion of remote sensing terminology and methods. Each student will be expected to produce an end-of-semester presentation, applying remote sensing principles to address a question of their choosing.

Course prerequisite(s): none

What knowledge and skills do the prerequisites imply students must have to take this course?

Class/laboratory schedule: Lecture/Computer Lab format; 3 credit hours; class typically meets twice per week in 75 minute sessions.

Required textbooks and/or other materials:
Remote Sensing and Image Interpretation, by Thomas Lillesand and Ralph Kiefer, 6th Edition, Wiley Publishing, ISBN 13: 978-0-470-05245-7 .

Course learning outcomes: Students completing the course should be able to:

1. describe remote sensing data and recognize its use in the modern world;
2. know how to efficiently acquire or obtain remote sensing data and to display them in effective ways;
3. understand the importance of knowing about the limitations in the acquisition of remotely sensed data, and the value of metadata in making these data useful to others;
4. manipulate remote sensing data in valid ways and combine remote sensing data with complementary data to discover hidden patterns;
5. draw useful and defensible conclusions from remotely sensed data.

Topics covered:

1. Concepts and foundations of remote sensing
2. Elements of photographic systems
3. Basic principles of photogrammetry
4. Introduction to visual image interpretation

5. Multispectral, thermal, and hyperspectral sensing
6. Earth resources satellites operating in the optical spectrum
7. Digital image interpretation and analysis
8. Microwave and Lidar sensing

Contribution of course to curriculum: Remote sensing is a vital tool for local- to planetary-scale observation of the Earth's environment.

Prepared by: Dale S. Sawyer **Date:** 27 June 2011